

GCSE Physics Electromagnetic Spectrum Wave Calculations

All electromagnetic waves travel at the same speed in a vacuum. In these questions, you will practise calculating speed, frequency and wavelength for different parts of the electromagnetic spectrum. Show all your working and give answers in standard form where appropriate.

1. A radio wave has a frequency of 1.0×10^6 Hz and a wavelength of 300 m. Calculate its speed.
2. A microwave has a frequency of 2.5×10^9 Hz and a wavelength of 0.12 m. Calculate its speed.
3. A microwave oven uses microwaves that travel at 3.0×10^8 m/s and have a frequency of 2.45×10^9 Hz. Calculate their wavelength.
4. An infrared wave travels at 3.0×10^8 m/s and has a wavelength of 1.0×10^{-4} m. Calculate its frequency.
5. Visible light travels at 3.0×10^8 m/s and has a wavelength of 6.0×10^{-7} m. Calculate its frequency.
6. An ultraviolet wave travels at 3.0×10^8 m/s and has a frequency of 1.0×10^{15} Hz. Calculate its wavelength.
7. An X-ray travels at 3.0×10^8 m/s and has a wavelength of 2.0×10^{-10} m. Calculate its frequency.
8. A gamma ray travels at 3.0×10^8 m/s and has a frequency of 5.0×10^{20} Hz. Calculate its wavelength.
9. A satellite communication microwave travels at 3.0×10^8 m/s and has a wavelength of 2.5×10^{-2} m. Calculate its frequency.
10. A hospital X-ray travels at 3.0×10^8 m/s and has a frequency of 3.0×10^{18} Hz. Calculate its wavelength.